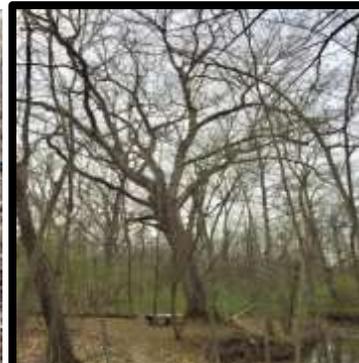




***Sourland Mountain Cultural Landscape Project***  
**A Cultural Landscape History of the Cedar Ridge Preserve**



**Hopewell Township, Mercer County, New Jersey**

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## EXECUTIVE SUMMARY

This is the report on a Cultural Landscape History of the Cedar Ridge Preserve, Hopewell Township, Mercer County, New Jersey. The Sourland Conservancy commissioned this study, making use of funds provided by the Mercer County History Regrant Program (FY2018), which is administered by the Mercer County Cultural and Heritage Commission.

Study of the approximately 170-acre Cedar Ridge Preserve, which is owned and managed by the Delaware and Raritan Greenway Land Trust, was designed both to research the landscape history of the preserve itself and to develop and test methodologies to be applied to cultural landscape studies elsewhere on preserved areas on Sourland Mountain. This is the proposed longer-term “Sourland Mountain Cultural Landscape Project”. An important methodology was the breaking down of the area into Analysis Units and the development of a terminology for describing boundaries.

Cultural Landscape History is a cross-disciplinary field of research. Documentary and oral history, archaeology, geology, soil and earth sciences, biology, and botany are all used to understand the development of cultural landscapes through time. It is now widely recognized that the landscapes of North America owe their present appearance, to varying degrees, to human influences and decisions.

The starting point for the Cedar Ridge Survey was a review of historic maps and aerial photographs. The first detailed historic map dates to 1849, while good quality aerial photography is available from 1931 onwards. From these, and from the work of previous researchers on the history of Hopewell and Sourland Mountain, it can be concluded that the clearance of woodland on Cedar Ridge probably began in earnest in the third quarter of the 18<sup>th</sup> century.

Prior to this, the area, like the rest of the Mountain, had been used for many thousands of years by the Lenape and their predecessors. Specific evidence for this comes from the discovery of a full-grooved stone axe, a minimum of 4000 years old, on a farm just south of the Preserve. Made of the local argillite stone, this artifact was probably used for the felling of small trees, the removal of tree limbs from larger trees, and similar tasks.

Confirmation of the use of the area for pasture in the early 1800’s comes in the form of a magnificent white oak pasture or “wolf” tree in the northwestern portion of the Preserve. This tree was dated to about 1780, using the non-invasive technique developed by the International Society of Arboriculture. Within a generation, this spreading tree would have been large enough to provide welcome shade for livestock drinking at the adjacent branch of the Stony Brook. Its spreading form indicates that there were no other trees in the vicinity at the time. By 1888, the date of the first highly detailed map (by the New Jersey Geological Survey), only a small area of woodland remained within the Preserve, on the southern boundary. The peach boom of the mid and late 1800’s may have included the Preserve, since the landform immediately to the south is identified as Peach Ridge in the 1850’s.

During the 1800’s an extensive program of boundary definition was undertaken. Unusually for New Jersey this often took the form of distinctive dry-laid walls of argillite constructed from

wedge-shaped slabs. These walls are typically about five feet wide at the base, narrowing to about 18 inches at the top where they are finished off with a flat “capstone”. These capstones show that the intended height was about three feet. Limited archaeological investigation of the junction of two of these walls showed that they were not constructed at the same time. Two walls can each be traced for distances in excess of 1800 feet.

Many questions remain about these walls. Two of them correspond to long-lasting property boundaries (and modern lot lines), but others do not. One wall reflects the boundary between two fields which had been consolidated into one by the 1930’s. In places the walls simply disappear or come to an end. It is not clear whether they were never completed in these sections, or if they have been dismantled and the stone used elsewhere.

Other important boundaries were not defined with stone walls. A major property boundary on the north, for example, is delineated by a tree line, and a corner angle at its western end is marked by a small stone property marker with an incised cross on the top. Some fields are defined by ditches without associated walls. Some field boundaries which are very clear on the aerial photographs from the 1930’s through the 1960’s have no physical expression in the landscape today: these may have been post and wire fences.

The vegetation succession in the abandoned pasture fields can be well observed through comparing the aerial photographs to the present-day vegetation. A distinctive area of open hickory and oak woodland toward the west side of the Preserve was evidently planted in the 1880’s, based on tree diameter calculations.

## CHAPTER 1. CULTURAL LANDSCAPE HISTORY: DEFINITION AND OBJECTIVES

This study of a small area of preserved landscape on the south side of Sourland Mountain in central New Jersey employs insights, methods and deductions from the emerging field of Cultural Landscape History. This multi-disciplinary endeavor seeks to recover and understand the history of the interaction of humans with the environment over time, recognizing that this interaction has been not only steadily increasing in intensity, but can now be traced further and further back in time.

Much as we may wish to think of our preserved open spaces as “natural”, it is becoming increasingly apparent that in large parts of the World human beings have for a long time played a substantial role in creating the landscapes we see today. This is particularly apparent in the intensively used and densely populated areas of Europe, the Near East, and South and East Asia. However, even areas as supposedly natural as the Amazon Basin are now known to have been intensively and radically altered by human societies in the past.<sup>i</sup> North America’s landscapes, too, are increasingly understood as (to a greater or lesser extent) culturally created or influenced. With this understanding has come an increasing interest in studying and understanding the details of this complex human/nature interaction. This can be viewed as one aspect of the recognition that the World is now officially in a new geological new era, the Anthropocene, in which humans are the decisive factor in the Earth’s ecology<sup>ii</sup>

In a regional context, this project applies the research insights, approaches and methodology of the currently largely New England-based discipline of cultural landscape history to a part of New Jersey (Sourland Mountain) which shares some historical characteristics with New England. In particular, these include a history of the clearance and exploitation of marginal lands for agriculture in the late 18<sup>th</sup> and 19<sup>th</sup> century, extensive use of stone walls as field, road and property boundaries during that time, and the large-scale abandonment of these landscapes in the later 19<sup>th</sup> and 20<sup>th</sup> centuries. Methodologies for studying the modern landscapes in order to understand past uses are engagingly presented in Reading the Forested Landscape: A Natural History of New England by Tom Wessels (Countryman Press, Woodstock, Vermont, 1999). An example of his work is given in Figure 1.1. Another important influence on this project, and the field in general, is the pioneering Common Landscape of America by John R. Stilgoe (Yale 1982), which took a multidisciplinary approach to the cultural study of the American vernacular, everyday, landscapes.

This cultural landscape approach recognizes that the rural landscape that we see today in the eastern United States, including what are commonly regarded as “natural” areas, is very largely the product of human interaction with the environment. It has developed a multidisciplinary research methodology which is able to identify, document and interpret this interaction through time. A skilled cultural landscape researcher can use the evidence from trees and other plants, from soil profiles, from historic maps and documents, and from historic cultural landscape features such as walls, roads, dams, foundations, and quarries, to trace the cultural landscape history of a piece of land through time.

An important stimulus to the development of the discipline was the very New England fascination with the stone walls which are found everywhere in the woodlands there. Setting aside the more fringe interpretations of these as the remains of lost cities built by Phoenicians or other transatlantic colonists, or landing areas for alien spacecraft, there is a body of substantial research on these features as what they truly are: boundaries erected by New England farmers in from the late 18<sup>th</sup> through the late 19<sup>th</sup> century. Of particular note are Susan Allport's Sermons in Stone: The Stone walls of New England and New York (W.W. Norton 1990) and Robert Thorson's Stone by Stone: the Magnificent History in New England's Stone Walls (Walker and Co. 2004). These works discuss many aspects of these walls: purpose, date, geology, agricultural practices, cultural patterns, labor and the mechanics of wall building, the micro-ecology of walls, economics, people and land, the roles of owners, tenants and slaves, and many others. Increasingly detailed studies are being published which explore these issues at the regional and local level (see for example Ives 2015).

The role of Native Americans in creating the landscapes we have today only began to be recognized by scholars in the late 20<sup>th</sup> century, of which the most influential is William Cronon's 1983 Changes in the Land: Indians, Colonists and the Ecology of New England (Hill and Wang). The main thrust of this research has been to identify the important role long-established Native American landscape management practices (such as controlled burning and garden agriculture) played in the subsequent placement and development of European settlements. More recently, some physical cultural features have been claimed to be Ceremonial Stone Landscapes created by Native Americans and subsequently often incorporated into the infrastructure of colonial farmsteads (United South and Eastern Tribes, Inc. 2007). An example of these claims in a regional context (Berks County, Pa) is in Muller 2008. While such claims are far from universally accepted in the academic community, their existence is by no means implausible, and should be taken into consideration during cultural landscape surveys.

As with all historical and archaeological disciplines, technology is revolutionizing the study of cultural landscapes. One of these technologies is LIDAR (Light Detection And Ranging), which can provide high-resolution imaging of the ground surface beneath a forested canopy. An excellent recent example of the use of this technique is Johnson and Ouimet (2014).

The second is Global Positioning Systems (GPS) linked to Geographic Information Systems (GIS), enabling the rapid mapping of points and polygons, and their accurate placement onto digital maps linked to databases.

Although there has been important work on the New Jersey landscape (chiefly Peter O. Wacker's Land and People; Rutgers University Press 1975), this project seeks to break new ground for New Jersey and for Mercer County. It will help to demonstrate in a concrete way how, to a very large extent, we humans now hold the character and fate of our landscape in our hands.

## 2. SOURLAND MOUNTAIN AND THE CEDAR RIDGE PRESERVE: A BRIEF OVERVIEW

Sourland Mountain is a long southwest-northeast landform running almost twenty miles from the Delaware River to Neshanic in New Jersey (Figure 2.1). It falls within the counties of Hunterdon, Mercer and Somerset, and rises to a maximum height of 568 feet above sea level toward its northeastern end. It is the first significantly elevated ground encountered by anyone travelling northwestwards from the Trenton/Princeton area, and is a dominant presence on the southern horizon in many locations in southern Hunterdon County.

The Mountain's distinctive topography, hydrology, landforms, geology, ecology and history have combined to make it a recognizable identity. This has been to some extent formalized by the definition of the boundary of a "Special Resource Area" recognized by the five townships whose territories include the Mountain, and who participate in the "Sourland Alliance" to improve communication and land-use planning. Advocacy for the conservation of the Mountain as a single entity has been led, since 1986, by what is now called the Sourland Conservancy (until 2013 the Sourland Planning Council).

The Mountain supports an extensive unbroken deciduous forest cover, which creates an important habitat for migratory and resident birds, and its hydrology permits the development of slowly draining vernal pools which provide breeding grounds for rare and endangered amphibians. In historical terms, the Mountain has an "otherness", reflected in its former reputation as a lawless "hillbilly" land where the social norms of the surrounding lowlands were flouted.<sup>iii</sup>

Geologically, the spine of the mountain is formed of an intrusive volcanic diabase stone which has eroded into the boulder-strewn landscapes and rocky outcrops seen on the higher elevations (Figure 2.2).

The Cedar Ridge Preserve itself is an area of about 170 acres in northeastern Hopewell Township, Mercer County, New Jersey. Owned and managed by the D & R Greenway, the preserve encompasses four lots in Block 5: Lots 5.02, 43, 22 and 14.03. It lies on the north side of Lambertville-Hopewell Road (County Route 518), between Stony Brook Road on the west and Van Dyke Road on the east (Figure 2.3).

The preserve chiefly consists of a ridge landform trending west-southwest to east-northeast, broadly delimited to the north and south by un-named tributaries of the Stony Brook. These run westerly to join the main course of the Stony Brook east of N.J. Route 31. The elevation ranges from just over 300 feet at the northeast to just below 220 feet along the southern tributary where it crosses Route 518.

The solid Geology is Lockatong Argillite, which is exposed in the stream beds and also outcrops in places along the southern flank of the ridge, roughly along the 260-foot contour. This material was widely used by Native Americans for stone tools, and was also employed historically for dry-stone field walling, and for paving and roofing<sup>iv</sup>. The topography is gentle for the most part,

although the southern slope of Cedar Ridge is moderately steep, and here there is a pronounced terrace landform created by outcropping argillite.

The majority of the soils in the preserve are Chalfont loams, with smaller areas of other similar loamy soils<sup>v</sup>. These deep, somewhat poorly drained and acidic soils can support hay, pasture and some cropland on gentle and moderate slopes<sup>vi</sup>, and occur extensively on Sourland Mountain<sup>vii</sup>. This geology and soil combination presents a much gentler aspect than the boulder-strewn and marshy landscapes seen on the diabase geology of the higher elevations.

### **3. SOURCES FOR THE LANDSCAPE HISTORY OF THE CEDAR RIDGE PRESERVE**

#### **A. Secondary Sources**

There is, unsurprisingly, no historical study of the Cedar Ridge Preserve itself. However, Hopewell and Sourland Mountain have both been well studied, and research is ongoing. The following are some of the more substantive secondary studies of the area. See also the References section of this document.

*Hopewell: A Historical Geography*, published by the Township of Hopewell in 1990 and written by local professionals Richard W. Hunter, and Richard L. Porter, is an essential source for any research involving Hopewell Township, and contains much specific and fully referenced detail.

T.J. Luce's, *New Jersey's Sourland Mountain* (Sourland Planning Council 2001) provides a comprehensive overview of many aspects of the Mountain, and is also well referenced with many primary and secondary sources.

African-American history of the Hopewell/Sourland area has been given a tremendous boost by the publication in 2018 of *If These Stones Could Talk: African American Presence in the Hopewell Valley, Sourland Mountain, and Surrounding Regions of New Jersey*, written by local researchers Elaine Buck and Beverly Mills (Wild River Books 2018). It is an important reminder that both free and enslaved African-Americans were active contributors to the creation of the Sourland landscape.

Richard Hunter's 1985 research study: *The Demise of Pottery Manufacture on Sourland Mountain, New Jersey, during the Industrial Revolution*, published in *Domestic Pottery of the Northeastern United States 1625-1850* (S.T. Turnbaugh editor) draws attention to the industrial history of Sourland Mountain and specifically to the use of diabase clays for pottery and tile manufacturing.

Behind these recent studies lies a body of earlier history and biography of varying value and quality. Ongoing research by individuals such as Larry Kidder, Elaine Buck and Beverly Mills, and by Hunter Research, Inc. of Trenton will continue to improve our understanding of the Sourland Region.

#### **B. Aerial Photography and LIDAR**

Vertical aerial photography is available for the project area as far back as 1931. These can be consulted at the New Jersey State Archives, and other copies are at the New Jersey Department of Environmental Protection. Commercial services offer high resolution files and prints in a variety of formats. For this study, images from 1931, 1953, 1963, 1972, 1995 and 2013 were purchased.

More recently, Light Detection And Ranging (LIDAR) imagery has become available in the region. The principles and applications of this technology are well summarized in Johnson and

Ouimet 2014. In essence, LIDAR creates a highly detailed image of the ground surface from a large number of data points. One of the main advantages for landscape history is that LIDAR has the ability to screen out the reflection from trees and ground cover and produce images of the ground surface through dense vegetation. Imagery used in this study was provided by the New Jersey Department of Environmental Protection. For landscape analysis, a resolution of one square meter or better is required, with an average point spacing of 2 points per meter (Johnson and Ouimet 2014:11). More extensive, higher resolution coverage is likely to become available in future.

### **C. Historic Maps**

Statewide maps of 1828, 1834 and 1839 are at too small a scale to show any detail of the area other than roads, confirming the existence of Stony Brook and Van Dyke Roads and Route 518 by 1828. The first map to show the project area in any detail is the 1849 Otley and Keily Map of Mercer County. County maps and atlases were published in 1860 (Lake and Beers), and 1875 (Everts and Stewart), (Figure 3.8) and in 1888 in New Jersey Geological Survey printed the highly accurate and detailed *Topographical Map of the Vicinity of Trenton* (Figure 3.9). Various later maps have also been consulted.

### **D. Property and Tax Records and Wills**

Deeds of the sale and purchase of real estate are filed with the Mercer County Clerk's office or with the New Jersey State Archives. Normally, these provide a written description of the boundary of the property, the names of the parties involved and the consideration (value) of the transaction. Tax records, inventories of property and can also provide information on landscape history. The scale of this project permitted only a limited use of these resources.

### **E. Oral History**

Conversations at the two Hopewell Train Station Series presentations for the Sourland Conservancy demonstrated the great potential for oral history for the landscape history of Sourland Mountain. Subsequent meetings with Charlize and Bru Katzenbach, and information from Laurie Cleveland and others, provided further insight.

### **F. The Biological Record**

Vegetation is a primary source for the history of landscape. The work of Tom Wessels (1997) is fundamental in this regard. Techniques such as tree-aging through diameter measurements and growth factor charts (International Society of Arboriculture <http://www.isa-arbor.com/>) can contribute, in particular, to understanding of the date of the reversion of cropland and pasture to secondary forest (Figure 3.10). The ability to identify tree species is key, greatly facilitated by such references as *Bark* (Wojtech 2011).

### **G. Cultural Landscape Features**

The final source is the cultural landscape itself. By this is meant any feature in the landscape which can be ascribed to direct human agency. As well as obvious features such as stone walls, cartways, and building foundations, there may be drainage ditches, quarry sites, water control features (e.g. dams), artifacts (such as refuse dumps or abandoned agricultural machinery, artificial terraces and other features.

## **CHAPTER 4. CULTURAL LANDSCAPE INVENTORY OF THE CEDAR RIDGE PRESERVE**

### **A. Survey Methods**

As much of the Preserve as possible was examined on foot during the winter months when visibility is at its best. The D & R Greenway trail network enables most areas of the preserve to be reached, or at least viewed from a distance. The main exceptions are the areas extending down to Route 518 (Analysis Units 3 and 8: see below). However, the dense understory restricts access in many places, underscoring the value of high quality LiDAR coverage for this type of survey in future.

The plan was to make extensive use of Global Positioning System (GPS) and Geographic Information System (GIS) technologies to map points, lines and polygons. A hand-held Bad Elf® GNSS Surveyor receiver with one-meter accuracy was acquired for the project. This was linked by Bluetooth technology to an iPhone with a data collection application for ArcGIS. Data were to be transferred via the Cloud to a PC which would process them using ArcMap and provide maps and attribute data outputs. Some progress was made in setting up this system, but relentlessly inclement weather and an injury suffered by Sourland Board Member and GIS expert Kevin Burkman prevented the full testing of the system in the field. It is clear, however, that such a system is viable for the future.

In the event it was found to be feasible to locate features with sufficient accuracy using a combination of map referencing (chiefly using the Hopewell Township Tax Map) and the Google Earth application on the iPhone. Annotated screenshots were captured on the phone and these were used to place points on the base map. This is more cumbersome and less accurate than the GPS/GIS system, but is useful in locating features where maps reference points are not available on the ground.

### **B. Analysis Units and Boundaries**

For ease of description and analysis, the Preserve was broken down into 23 “Analysis Units” (AU’s; see Figures 4.1 and 4.2). For the most part these are based on the historic field and property boundaries visible on the 1953 aerial photograph, taking into account later modifications and lot subdivisions. The numbering runs broadly from northwest to southeast, so that AU 1 is the parcel adjoining the east side of Stony Brook Road, and AU 15 lies on the west side of Van Dyke Road. This system facilitates systematic consideration of the Preserve as a whole, and also reflects the importance of the boundaries, which define the units, for landscape analysis.

AU boundaries were designated by their relationship to the AU’s themselves. Boundaries 4/7 and 4/6, for example mark the boundary between AU’s 4 and 7 and 4 and 6 respectively. See Figure 4.3.

## **C. Cultural Landscape Features (Figure 4.6)**

### **Boundaries**

What is striking is the variety of boundary demarcations between the AU's, most of which can be regarded as functioning as fields or woodlots in 1953. A total of 63 boundaries were defined. Of these, only two were completely inaccessible. The remaining 61 breakdown as follows:

Bank or Slight Bank (7 instances). These are features which are considered to be too low and/or narrow to be collapsed stone walls. They may represent accumulations of material pulled to the edge of fields by cultivation but not necessarily functioning as boundary features.

Bank, trees above (1 instance). This (12/13) is likely to be a collapsed stone wall on which a mature tree line has developed: perhaps an indication that some walls are an early component of the boundary system.

Creek (3 instances). The boundary is effectively defined by the creek bank.

Ditch alone (4 instances). These features appear, from their sharp profiles and exposed soils, to be recent efforts to improve drainage in the western and southeastern meadow areas.

None (21 instances). These are locations where no indication of a demarked boundary is apparent, apart from a change in vegetation pattern in some instances.

Post and Wire (1 instance). A short stretch of post and barbed-wire fence is present along 18/23. It seems very likely that many other boundaries were defined in this way in the past. Certainly a post and wire fence was in place on the top of wall 14/19 at one time, since one post survives at the dogleg angle here.

Stone Bank (1 instance). At the west end of 17/23, this seems likely to be the remains of a dismantled wall.

Stone Bank with Trees on top (2 instances). These appear also to be collapsed walls on which mature tree lines have developed.

Stone Bank with Ditches (3 instances). In these instances the banks may simply be upcast from the ditches.

Stone walls (10 instances). See below. 17/18 is clearly a stone wall over which a mature tree line has developed.

Tree Line (4 instances). These are boundaries where mature trees have developed along the boundary line, either as a deliberate demarcation, or as a result of the overgrowth of abandoned hedgerows. No clear evidence was observed of formally planted hedgelines, however.

## Stone walls

The iconic character of stone walls in the literature means that they merit detailed attention in this study. Sourland Mountain is one of the few areas in New Jersey where stone walls are present. Stone Walls are actually a rare cultural resource in the state.

In 1871 the U.S. Department of Agriculture, remarkably, published statistics of fencing types in the United States. These were some of the results:

- Connecticut: 20,505 miles of stone walls (one third of all the fencing in the state).
- Rhode Island: most of the 14,030 miles of fencing in the state were stone walls.
- Massachusetts: 50% of all fences were stone.
- New York: 95,364 miles of stone walls were recorded.
- In New Jersey only 5% of fences were stone walls, most in the northern counties. 62% were post-and-rail, 29% were zig-zag or worm, and 4% board (Allport 1990).

In 1858 it was estimated that one man could erect three rods (about 50 feet) of stone walling in a day (Stilgoe 1982:190). This figure assumed that the stone had already been gathered and brought to the construction site, tasks that probably entailed an equal amount of labor to the construction itself. The longest continuous surviving length of wall at Cedar Ridge, forming the northern boundary of Block 5, Lot 43, extends for around 2000 feet. On the basis of the 1858 figures, it would therefore have taken about 40 person days (perhaps 6-7 weeks of continuous work) to build. It is however likely that this task would be interspersed with others and completion may have in fact taken several months. Through careful examination of the placement of the stones it may be possible to distinguish breaks in construction which correspond to single episodes of work. This has not been attempted in this study but is worth considering for the future.

Consideration of stone walls has focused on several questions:

1. Their date
2. Their function
3. How they were built and by whom
4. Construction methods and the influences upon them
5. Why walls were built in some areas and not others.

At Cedar Ridge, question 5 is perhaps the most interesting. All the walls are built of local argillite, which is available all over the preserve. Why, therefore was this method of fencing and boundary definition only used in some instances?

*Hypothesis 1: Stone walls were at one time more prevalent, but many have been removed or have collapsed.* It is clear that in some cases stone walls have collapsed and been reduced to stony banks. In places, trees have been allowed to grow over the top, creating a new boundary. Although the surviving walls are robustly built, it is clear that two factors, freeze/thaw processes and tree falls and new tree growth, will eventually destroy walls that are not maintained. This does not, however, explain the manner in which some walls simply end without trace. In these cases oral history provides a clue. An anonymous informant related how his father and others,

perhaps in the 1950's, used to dismantle stone walls, load the stone into trucks and take it away for re-use or sale. This could only be done where vehicular access was possible, and therefore walls along roads were targets of choice. Some of the "missing" sections are close to cartways, especially the east-west access corridor in the southern part of the preserve.

*Hypothesis 2: Stone walls were only used to define major property lines.* The long wall which separates AU's 12-16 from AU's 17-21 is the current lot line between Block 5, Lot 43 and Block 5, Lot 5.02. It has a ditch on its southern side and there are no visible gateways or openings connecting the north and southern sides (the current trail heading north into AU 13 uses a recent breach in the wall). The wall on boundary 8/17, which runs south from the western end of this wall as far as the southern creek, marks the boundary between Lots 43 and 22, and has a ditch on its eastern side. These are strongly defined and presumably long-established property boundaries. Similarly, the boundary between AU 8 and Lots 45 and 46 is strongly defined by east-west and north-south stone walls.

Walls that do not seem to fit this pattern are the eastern extension of AU 8/Lot 46, and its northward return and reappearance to the north as a finely laid wall along the 7/9 boundary (which is not a lot line). There has been modification to the boundaries in this area (see below), and the walls here appear to reflect a primary arrangement which has been changed later. The wall on the 13/14 boundary appears to be of one build with the long wall which separates AU's 12-16 from AU's 17-21, but does not otherwise appear to be a major boundary.

The best-preserved runs of walling show a distinctive construction technique which makes use of the tendency of the argillite to break into slabs which are thicker at one end than the other. Figure 4.4 provides an excellent view of the technique. These walls are about 5 feet wide at the base and taper to about 18 inches at the top. They are typically about three feet high and are finished at this height by horizontal capstones.

Taken with the evidence from collapsed walls which have been succeeded by tree-lines as boundaries (e.g. 12/13), the evidence appears to suggest that the stone walls are an earlier component of the landscape chiefly used for the definition of major boundaries. The boundaries of the smaller individual fields did not usually involve the construction of walls. These boundaries were probably defined by post-and-rail or by worm fences. By the late 19<sup>th</sup> century the former were more prevalent.

One possible way of establishing the date of stone walls is through examination of lichen growth (lichenometry). Crustose Lichen grows 1mm per year. If a lichen can be shown to have started developing on a rock after the rock's placement in a wall, the lichen's age (as determined from the diameter of the growth) will provide a terminus ante quem (date before which) the stone was put in place, and therefore an indication of the minimum age of the wall.

*Hypothesis 3: Stone walls were only built where stone was available in the immediate vicinity and only limited hauling of stone would have been required.* The most prominent walls lie on the southern flank of the ridge, close to the 260-foot contour where argillite outcrops along the southern side of a terrace formation. This terrace is particularly apparent along the northern limits of AU's 8, 17 and 18. Stone for walls could have been obtained from this outcrop, and

there is evidence for quarrying at the western end of AU8. If it is assumed that the walls are contemporary with the ditches, these would also be an obvious source for the stone.

One contrast with New England is apparent at Cedar Ridge. It is generally accepted that in many areas of New England stone field walls were a result of the clearing of the ground of fieldstones and boulders in order to create land for tillage and pasture (Stilgoe 1982: 182). The mechanics of this meant that the most efficient field was a square roughly 300 feet on a side, covering about 2 acres (Allport 1990). On the argillite portions of Sourland Mountain like Cedar Ridge, boulders and fieldstones are not a prominent feature of the landscape, and the Chalfont soils, though stony, are quite deep. This suggests that the mechanics of field creation and wall building are quite different here. The smallest fields within the preserve are, it may be noted, in two east-west rows on either side of the long wall (AU's 12 through 20). These average about 3.5 acres in size and have common northern and southern boundaries. On the New England model, these might be expected to be surrounded by stone walls derived from field clearance, but only the common east-west long wall is of stone.

In conclusion, it may be proposed that the stone walls at Cedar Ridge are:

- Early features in the Euro-American landscape sequence.
- A conscious choice in the use of quarried stone in an area where other options were available for defining boundaries
- Intended as emphatic boundaries, for the most part without gates or gaps providing access from one side to the other.
- Probably indications of the primary 18<sup>th</sup> century subdivisions of the large landholdings of Daniel Coxe and others.

Some details of the walls defy immediate explanation. Most evident from the trail system is the “mystery corner” or dogleg in the long east wall at 14/19 (Figure 4.7). This adjustment to the alignment of the wall must reflect a specific decision taken about the boundary, but the reason for that decision is unknown at this point.

### **Fields**

The grouping of small fields in the east part of the preserve (described above) contrasts with the much larger, north-south trending somewhat narrow rectangular fields from AU's 8 and 9 westwards to Stony Brook Road. Continuous north-south boundaries roughly 2000 feet long are present (2-3/4-5; 4/6-7-8; 6-7/9; 9-8/10-12-17), running across the ridge between the two creeks. One may suspect that AUs 6 and 7 were initially one field. These larger fields presumably reflect differing farming practice than the small fields to the east. However, the prevalence of eastern redcedars in both the large field AU 7, and the smaller fields AU 12 and 13 suggest that all these locations were permanent pasture in their last agricultural usage.

### **Pasture Trees**

Trees which have grown in open environments without close competition from other trees develop spreading canopies that provide shade. In New England these are sometimes referred to as *Wolf Trees*, probably because of their solitary or “lone” character (Wessels 1997:42). At Cedar Ridge, a few pasture trees can be seen in the southern parts of AUs 8 and 3, and there are

probably others across the Preserve. Pride of place however goes to the magnificent white oak (*quercus alba*) located at the northwest corner of AU 6 by the northern of the two Stony Brook branches (Figure 4.5). Tree dating using the diameter measurements and growth factor charts of the International Society of Arboriculture suggest that this tree started to grow in about 1780. This is probably the time period when active clearance of the Preserve area was in progress. The sapling may have been deliberately left in place, or grew unremarked at this location by the edge of the field and shading the creek until its value as a shade tree became apparent in the early 1800's. Either way it is a strong testimony to the use of at least this part of the Preserve for grazing in the early Federal period.

### **House Sites**

Historic maps suggest the former presence of two houses in the western part of the Preserve (Figure 3.8): one in AU 1, and the second probably just southwest of AU2. The 1849 Otley and Keily maps shows a property ascribed to "A. Hunt" (one of the prominent early family names in Hopewell) within AU 1 and south of the northern of the two Stony Brook branches that bound the preserve. This does not appear on the 1860 Lake and Beers or on subsequent maps, and there is no indication of a house site on either the historic aerial photographs or from surface inspection.

On the 1875 Everts and Stewart map a house ascribed to "Pr (Pastor?)" Rink is shown further to the south at the eastern end of a driveway leading from Stony Brook Road. This does not appear on earlier or later maps. Given the small scale of the mapping it is very difficult to locate this with any precision, but it may correspond with the "flag lot" 14.031, which has a right-of-way extending from Stony Brook Road and is not part of the Preserve. There is also a slight suggestion of a driveway to the north of this, marked partly by cedar trees and leading to a small cluster of trees which could reflect the location of the structure, but aerial photographs and LiDAR coverage do not provide any additional information.

### **Property Corner Marker**

The northwest corner of AU 10 is at a 90-degree change of direction on the Preserve boundary where AU 10 meets the eastern boundary of AU 9. The northern boundary of AU 10 is generally demarcated by large mature trees, but the eastern boundary of AU has no visible definition. The actual corner is however marked by a rectangular argillite block set in the ground and marked with a cross on the top (Figure 4.8).

### **Stone Cairn AU 21**

Stones are piled against the south side of 16/21 close to the 20/21 boundary. This suggests some secondary clearance or removal of stone that could not be placed on top of the existing wall.

### **Trash dump in AU14**

The scatter of chiefly ferrous trash visible in the southeast corner of AU14 is probably 20<sup>th</sup> century in date. It is a reminder of the necessity for farmers to dispose of bulky items somewhere on their own property prior to the initiation of municipal trash collection.

### **Quarries**

Stone could be obtained from the beds and banks of the creeks, and also perhaps from the digging of ditches. However, the argillite outcrop that runs along the 260 foot contour on the south flank of the ridge appears to have subjected to quarrying to obtain larger more regular blocks of stone. This particularly apparent at the western end of AU 8 (Figure 4.9).

### **Landscape Changes in north part of AU 8**

Figures 4.10 and 4.11 show evidence for reorganization of the landscape in the northern part of AU 8. Much of this area had reverted to open woodland by 1931, and by 1953 it was crossed by multiple tracks through the open woodland, most of them converging on the southeastern corner of AU 7 and trending southeastwards to tracks running along the north side of the creek (Figure 4.11).

The main feature is a 285-foot length of walling which extends eastward across AU 8 from the northwest corner of Lot 46. At its eastern end it turns north for about 30 feet before apparently ending in a neat squared-off terminal. Closer examination however shows that this north-south wall at one time extended north for at least another 100 feet, almost to the 8/9 boundary. It has been obscured by the modern trail system, which evidently follows the trails already in place by 1931. It seems probable that it once extended northwards to meet with the 7/9 boundary wall, which only reappears about 300 feet to the north,

Set close to the angle of these two walls is an east-west wall about 25 feet long defining the south side of a small terrace (Figure 4.10). Short return walls extend northwards from its east and west ends. This is clearly the site of a former building, the walls either being the foundation itself, or, more probably, revetments for the terrace on which a frame(?) structure once stood.

On the east side of the north-south wall is a ditch, close to the northern end of which a section of east-west trending wall extends eastwards for about 75 feet, defining the south side of the terrace created by the argillite outcrop.

In order to explore the sequence of events in this area, a modest archaeological intervention was undertaken at the wall junctions at the northeast corner of Lot 46 (Figures 4.13, 4.14). The north-south wall had been removed for a distance of about 50 feet south of the junction, but sufficient foundation stone remained to establish that this wall was secondary in construction to the east-west wall, which commences at the northwestern boundary of Lot 45 and extends eastward for some 650 feet.

This all seems to suggest an earlier landscape organization in which the terrace zone along the north side of AU 8, which also extends at least another 1000 feet eastwards through the northern parts of AU 17-19, was a well-defined corridor about 75 feet wide, possibly connecting Van Dyke Road with the large pasture fields in the western half of the preserve. There may have been gates across the corridor where walls and other boundaries cross it. This feature is probably to be interpreted as a wide lane along which cattle could be driven from one area to another across the landscape, having opportunities to graze along the way. Features like these, with walls on either side, can be observed at other locations on Sourland Mountain, with a particularly clear example lying along the central portion of the recently created Rocky Brook Trail extending north to Snyderstown Road from Route 518 just east of Route 31.

## 5. NARRATIVE

### A. The Pre-European Landscape

Prior to European settlement, the Cedar Ridge area would probably have been covered by mixed oak and chestnut hardwood forest. This would have contained many other species of trees including hickory, maples, ash, tulip, beech, cherry, and elm (Robichaud and Anderson 1994: 109-115), as well as a variety of smaller woody species and plants which were used for food and medicinal purposes (Kraft 278, 287)

The extent to which this landscape would have been used and modified by Native Americans is difficult, but perhaps not impossible, to assess. The discovery of grooved stone axes made of the local argillite at various locations on the argillite formation of the mountain indicate that, at the very least, people were exploiting the timber resources (as well as nuts, seeds and other foods) here at least 3000, and possibly as much as 6000, years ago. The closest of these is a so-called “full-grooved” axe of argillite (Figure 5.1) found some years ago near a springhead on the Katzenbach Farm which lies between the Preserve and Route 518, on the north slope of the landform known in the mid 19<sup>th</sup> century as Peach Ridge. This fine example, when set in a wooden haft, would have been able to fell and trim trees to make clearings and to provide timber for shelters, canoes and other purposes. (Burrow 2018). Native Americans were adept at felling even quite large trees (Cronon 1983), and so selective modification of the climax vegetation may have taken place. It is not known whether any of the Hopewell Museum’s collection poorly provenienced argillite hoes, which clearly reflect horticulture in the area from about 1000 years ago, are from the mountain itself.

It seems clear that by the time of European contact in the late 1600’s there was at least one Lenape settlement in a similar topographical location to Cedar Ridge. This was known as *Menapenascon* or *Minnepenasson* and was apparently located northeast of Hopewell Borough along the headwaters of the Beden’s Brook. It was sufficiently well known to be used as reference point on the boundary description in the 1688 deed by which Daniel Coxe acquired the area of today’s Hopewell and Ewing Townships from local Lenape. Another settlement, *Wissamonson*, allegedly lay only about a half-mile south of Cedar Ridge, and there is a further report of Contact-Period materials being found on Pheasant Hill to the east of Cedar Ridge (Hunter and Porter 1990:24).

The best chance for understanding the extent and character of Native American modification of the Sourland landscape will lie in the discovery of deep, waterlogged organic-rich sediments on or near the mountain. Under suitable anaerobic conditions and acidity levels, pollen or plant remains can survive, in datable sequences, for thousands of years. The identification of such paleoenvironmental resources would add significantly to our understanding of the history of the Sourland Landscape.

While some of the argillite outcrops and argillite cobbles from the stream-beds may well have been used by Native Americans, no evidence of this was identified during research. Neither was there any suggestion of the presence of Ceremonial Stone Landscapes within the areas examined.

Larger stone tools may have been incorporated into later stone walls, and this possibility should always be considered when surveying these features.

## **B. Early European Settlement**

On March 30<sup>th</sup> 1688 Daniel Coxe, then governor of West Jersey, acquired the area of today's Hopewell and Ewing Townships through a deed signed by 11 Indian "Sachimackers", or community leaders. The actual English settlement of the northern part of the Township began in the 1690's, and in 1697 400 acres in the area of *Wissamonson*, just to the south of Cedar Ridge was acquired, and probably rapidly developed, by Dr Roger Parke. In about 1704 Jonathan Stout, the first of what was to become a prolific local family, settled near the Province Line close to the site of *Menapenascon/Minnepenasson* (Luce 2001:21). Based on similar situations elsewhere, particularly in New England, it seems likely that both these early settlers made use of land already cleared by Native Americans. Legal disputes created uncertainty about the validity of many land titles in the first half of the 18<sup>th</sup> century, but, once these were resolved, settlement apparently expanded rapidly (Hunter and Porter 1990: Chapter 4).

A key element in the development of the Cedar Ridge area was probably the extension of the road network. Stony Brook Road and Van Dyke Road had both been laid out in 1771, connecting the southern slopes of the mountain with the much older Hopewell-Pennington Road, while Route 518 was created in 1816 as the Georgetown and Franklin Turnpike (Hunter and Porter 1990: 185, 187).

The area of the preserve has therefore been readily accessible since the late 18<sup>th</sup> century. By the early 1800's trees had been cleared from the northern part of Analysis Unit 6, but a white oak tree was being permitted to flourish as a shade tree for cattle along the south side of the branch of the Stony Brook.

## **C. The 19<sup>th</sup> Century**

In the absence of a detailed property history, the first indication of ownership around the Preserve is the 1849 map. This shows three farmsteads located on the roads around the preserve: A. Hunt on Stony Brook Road, S. Titus on Route 18, and P. Harvey on Van Dyke. Titus and Hunt are names which appear in the 1690-1725 period in Hopewell (Hunter and Porter 1990: 50), and it is possible that these two farmsteads were founded in the 18<sup>th</sup> century and were responsible for creating the main landscape divisions still present today. Tentatively it can be suggested that the longer stretches of stone walls, especially those functioning as lot-lines, may already have been built by this time.

By the time of the 1849 map, peach cultivation had started on the Mountain, with two peach orchards being shown northwest of Marshall's Corner. In the 1850's the ridge immediately to the south of the main Preserve landform was known as Peach Ridge, so it is possible that some peach cultivation was being undertaken in the area of the Preserve by that time.

By 1888, the only forested area within the limits of the present Preserve lay along the south bank of the southern of the two Stony Brook branches and extending a short distance up the north slope of Peach Ridge. Examination of this area does not suggest, however, that it is in any way unaltered climax woodland: it has evidently been exploited as a woodlot over a long period, and at times was open enough for spreading pasture trees to develop in places. While there may have been treed hedgelines and even small woodlots on the rest of the property, the State Geological Survey did not observe anything else that they considered to be woodland.

The re-issue of this map in 1903 did not show any changes in the woodland cover, but it seems clear from dating of trees in AU 2 that this area had been planted with shagbark hickory and white oak by this time, possibly in the 1880's.

#### **D. 20<sup>th</sup> Century to Present**

By 1931 further inroads had been made into the surviving woodland south of the creek, but trees were taking over in the northern portion of AU 8. In 1953 a few fields are showing signs of abandonment. Cedar trees can now be seen growing in the southern portion of AU 9, in AU 6 and scattered across AU 4 (where dead snags of these trees are still present in 2108). 1972 sees the definite abandonment of all the large fields in the western portion of the preserve (AU's 2, 4, 5, 6, 7 and 9), with the exception of the southern portion of AU 1. Fields to the east all appear to be under active management with the exception of AU's 14 and 16. By 1995 only three fields (AU's 19, 20 and 21 in the southeast) appear to be regularly maintained. AU 10 now has what are probably young red cedars over much of its surface. By 2013 AU's 1 and 4 are evidently being managed as grass meadow with a few trees, and AU's 20 and 21 are still free of secondary growth. AU 10 continues to be colonized by trees, and in 2018 it is a fenced area where the regrowth sequence and the success (or otherwise) of native species recolonization is under observation.

## CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

1. The Analysis Unit system and reference system for the boundary identification between the units has proved to be a flexible and informative way of the documenting the preserve.
2. Late fall and late winter are by far the best times to carry out fieldwork in these environments. Visibility rapidly decreased with the onset of spring growth.
3. It proved relatively easy to locate identified features through a combination of measurement from field boundaries and use of location capabilities of Google Maps on an iPhone 6. Locations could be captured through screenshots and then transferred to maps.
4. The higher resolution GPS location capabilities of the Bad Elf GNSS Surveyor purchased by the Conservancy for the project, when linked to a data collector for ArcGIS should however be used in future surveys.
5. Full documentary study of the ownership history of the project has not been possible. The properties have gone through multiple changes of ownership in the last 100 years. This, combined with boundary changes and subdivisions of some of the properties, made deed research much more time-consuming than anticipated. Over half the area has been deed-traced to about 1900, but much more remains to be done and it will be desirable to trace the property ownerships back to the late 1700s in order to test the hypothesis that this time period is when large undeveloped holdings began to be broken up and more intensive clearance and agriculture was commenced. The project budget was insufficient to support this effort.
6. Oral history is a research tool which should be used more intentionally for these kinds of studies in future.
7. The International Society of Arboriculture's tree-aging method has proved to be a very useful tool, especially in areas of denser woodland where trees are in competition. Opportunities should be taken to further test this methodology by measuring trees whose dates can be independently deduced (e.g. from aerial photographs showing early stages of succession of eastern red cedar on pasture). This can be undertaken as a valuable and enriching volunteer program.
8. The information potential of stone walls can be further explored by looking for evidence of breaks in construction that reflect individual construction episodes, predicted to be of a day or less in duration. Dating of the walls can be pursued through Lichenometry.
9. High-resolution LiDAR imagery will provide extremely valuable information when available.
10. The research methodology adopted for this project appears capable of producing meaningful results on the development of cultural landscapes on Sourland Mountain.

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Figure 1.1. Abandoned pasture in New England (Wessels 1997:50). The fieldstone wall is capped with a post and barbed-wire fence to help contain cattle. Two large wide-spreading pasture or “wolf” trees grow beside the wall. The low juniper or eastern redcedar tree (*Juniperus Virginiana*) on the right is a species that is well adapted to colonize old pastureland (as at Cedar Ridge). Small secondary growth trees have all started growing at the same time and are therefore in competition for space and growing vertically. Very similar features can all be seen at Cedar Ridge and on other parts of Sourland Mountain.

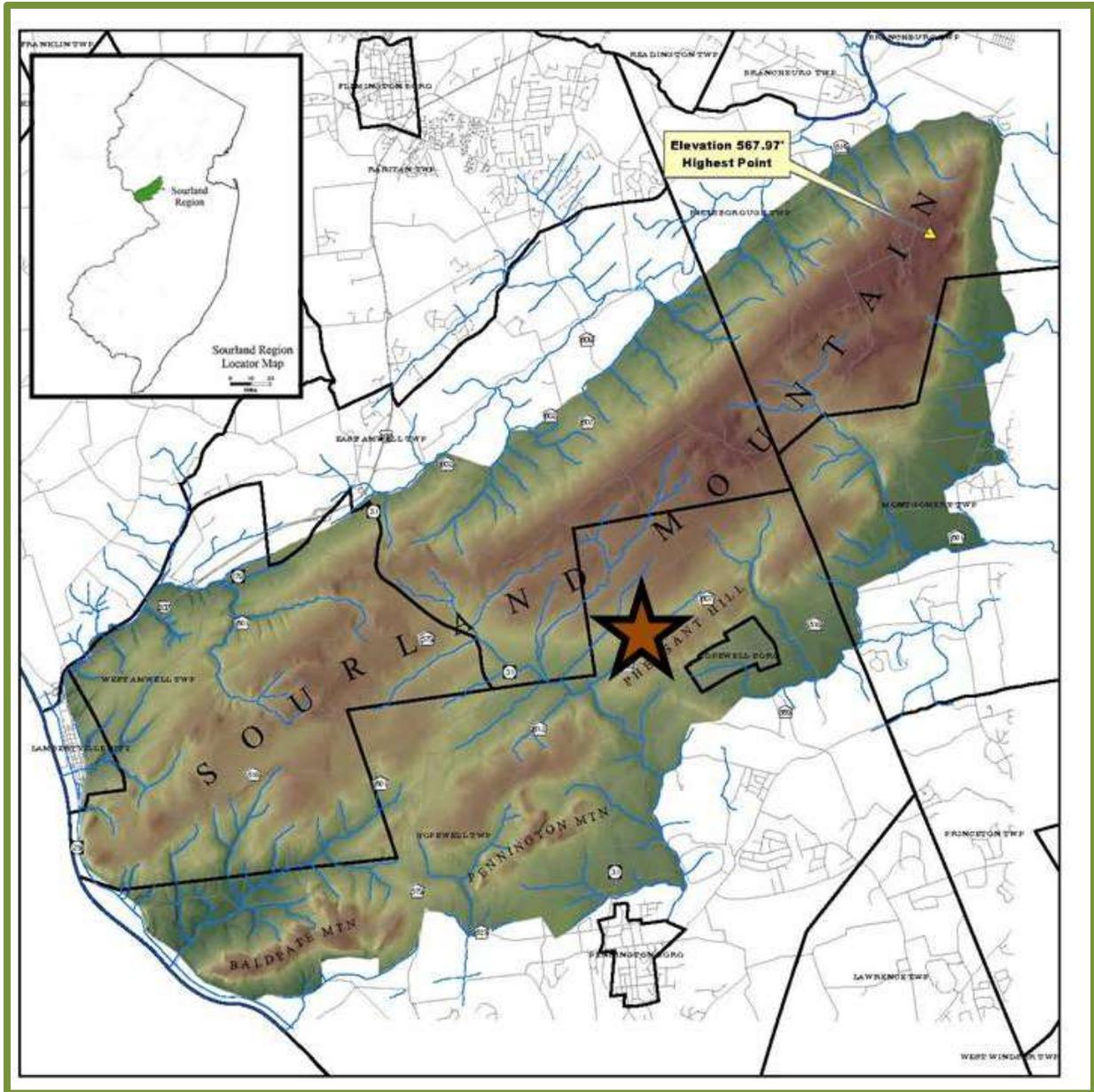


Figure 2.1. Sourland Mountain: Topography and hydrology, with municipal boundaries. The Cedar Ridge Preserve is marked by the star. Inset: Location of Sourland Mountain in New Jersey. Maps by Banisch Associates.

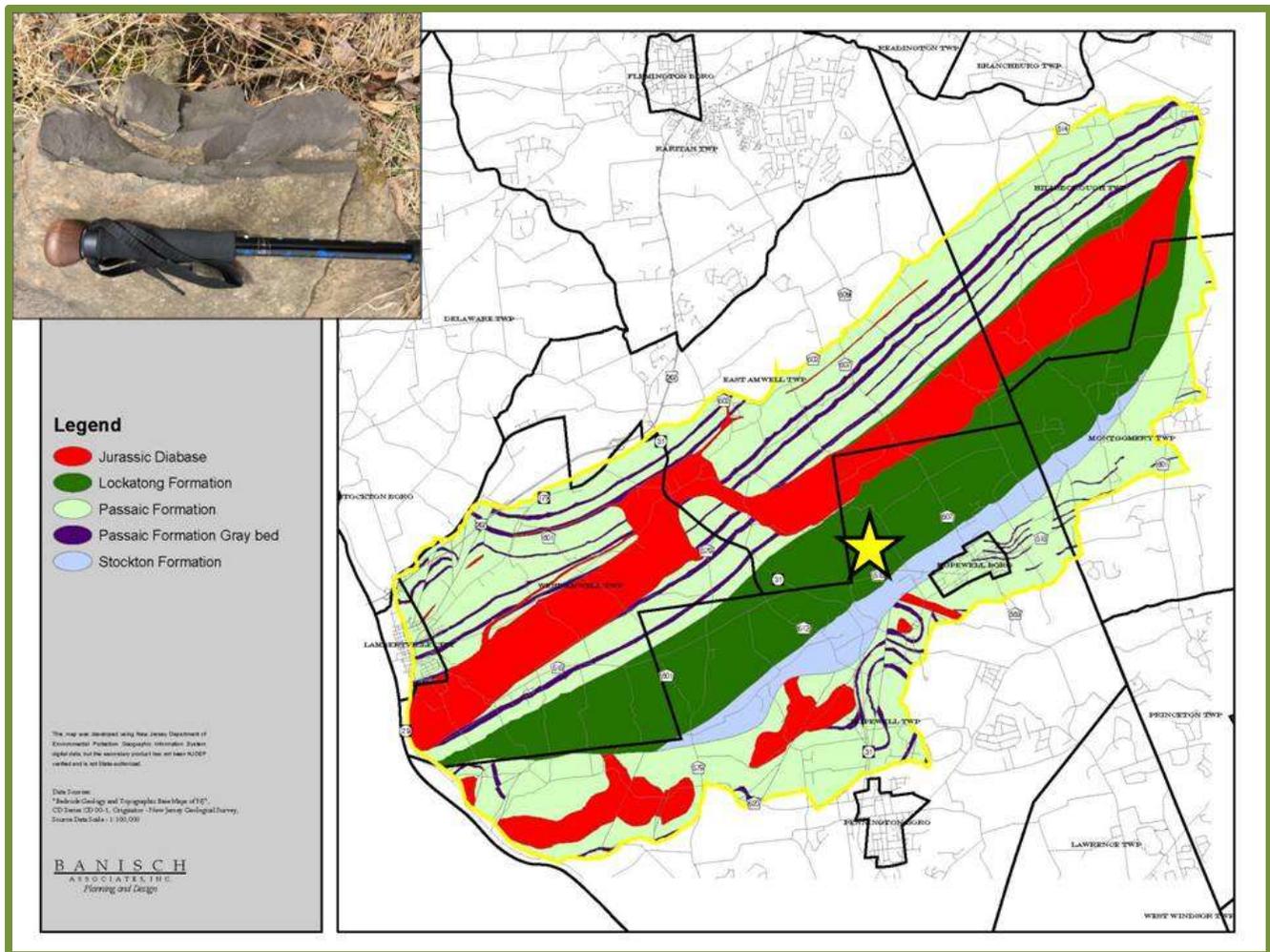


Figure 2.2. The Solid Geology of Sourland Mountain. The Cedar Ridge Preserve (yellow star) is on the Lockatong Argillite formation, which lies south of the diabase “spine” of the mountain (in red). Map by Banisch Associates. Inset: split argillite slab at Cedar Ridge.

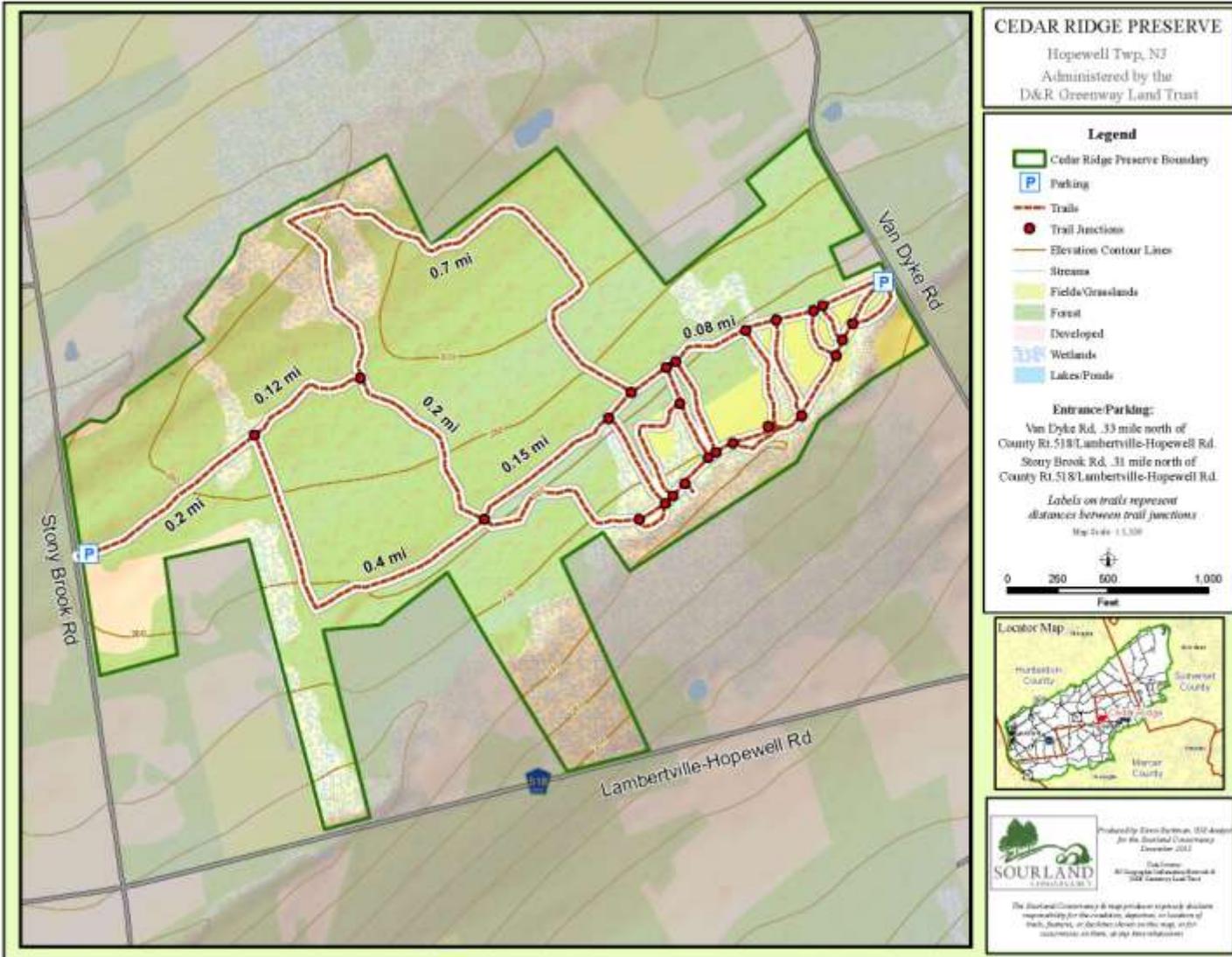


Figure 2.3. The Cedar Ridge Preserve, showing trails and approximate vegetation cover. Sourland Conservancy.



Figure 3.1. 1931 Air photograph of the Cedar Ridge Area.



Figure 3.2. 1953 Air photograph of the Cedar Ridge Area.

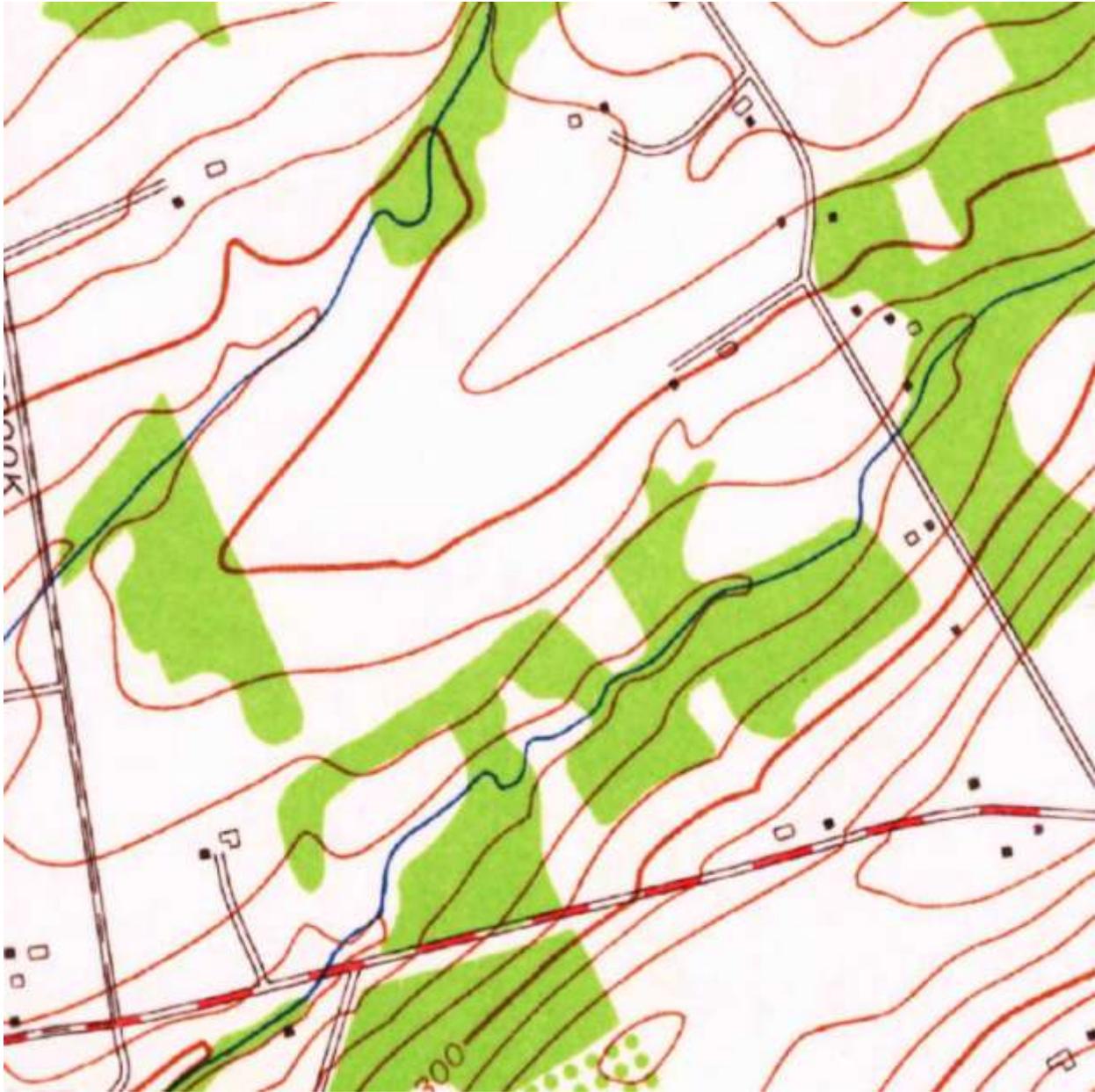


Figure 3.3. The Cedar Ridge Area on the 1963 U.S. Geological Survey 1:24000 sheet. Compare woodland (green) with Figure 3.2.



Figure 3.4. 1972 Air photograph of the Cedar Ridge Area.



Figure 3.5. 1995 Air photograph of the Cedar Ridge Area.



Figure 3.6. 2013 Air photograph of the Cedar Ridge Area.

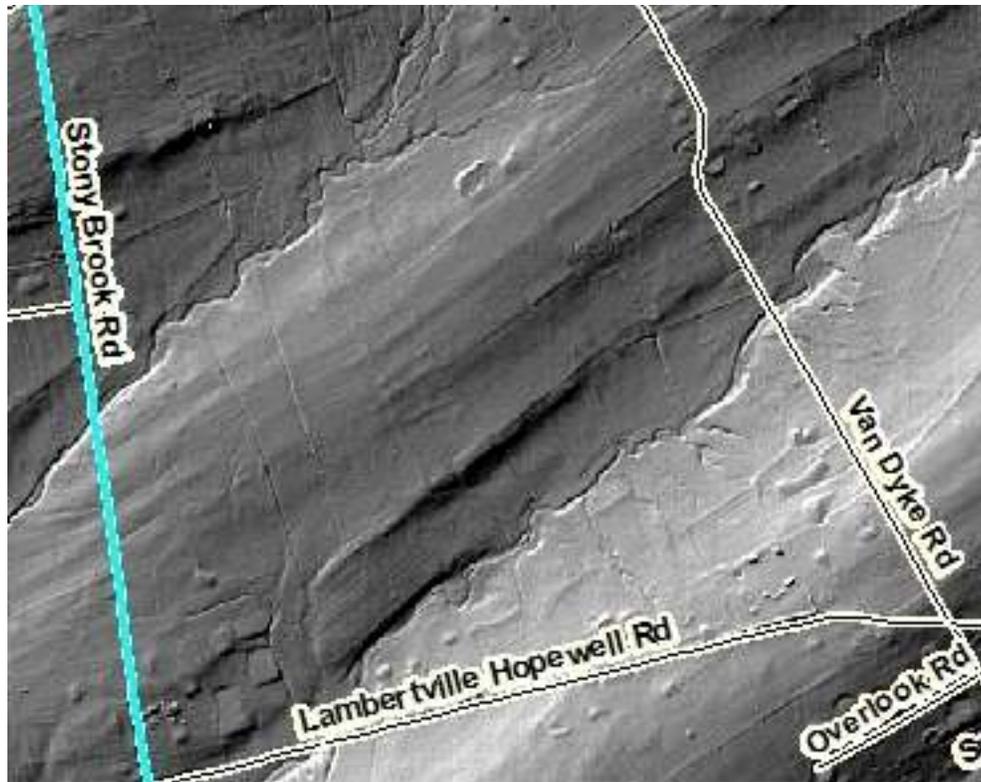


Figure 3.7. The Cedar Ridge Area on a LiDAR image reference 2017-09-13\_104936. Many field boundaries are visible. The steep slope and terrace landform created by the argillite outcrop running southwest-northeast is also prominent. Source: New Jersey Department of Environmental Protection.

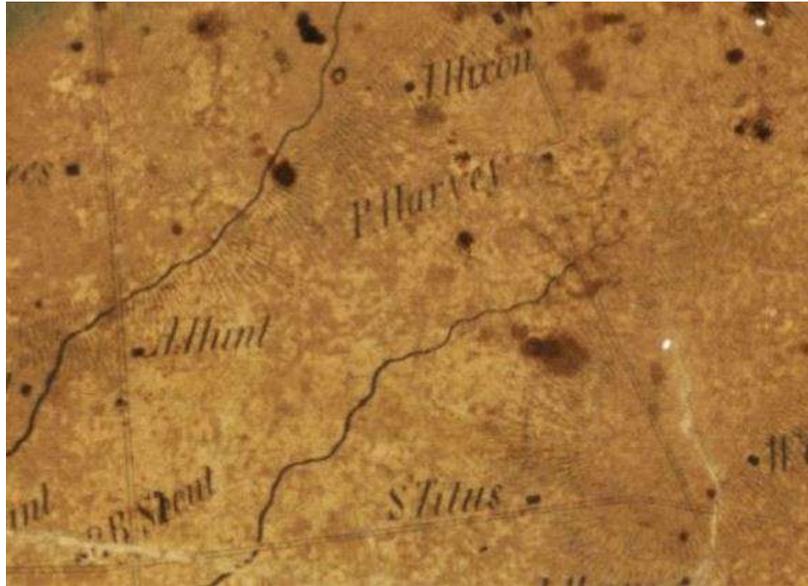


Figure 3.8. The Cedar Ridge Area as shown on the 1849 Otley and Keily *Map of Mercer County* (top) and the 1876 Everts and Stewart *Atlas Map of Mercer County* (bottom)

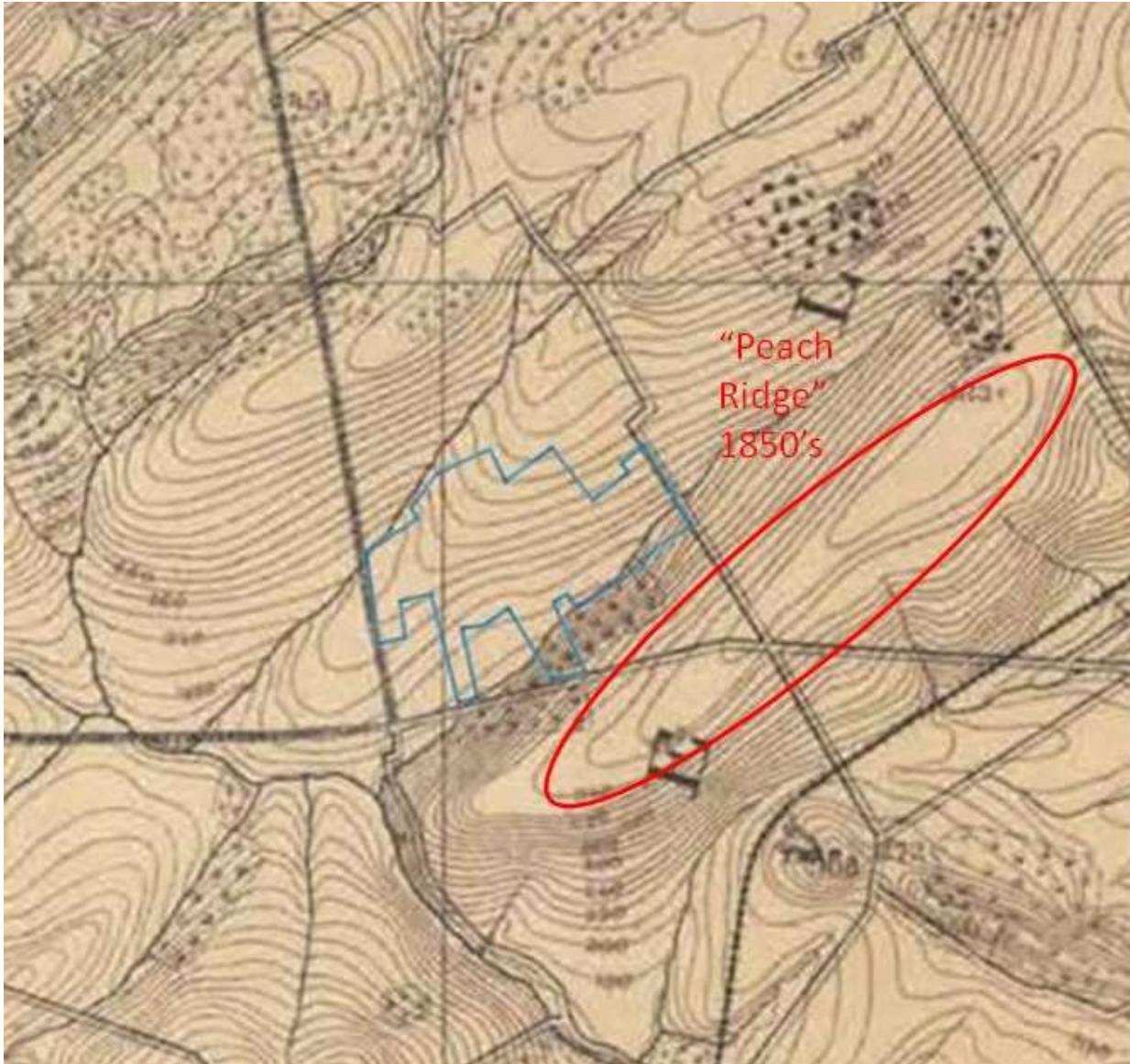


Figure 3.9. The Cedar Ridge Preserve (blue outline) on the 1888 New Jersey Geological Survey Trenton Atlas Sheet. Note the small area of woodland mapped on the southern flank of the Preserve. The area known as “Peach Ridge” in the mid 1800’s is outlined in red. It is labeled this way on the 1860 Lake and Beers *Map of the Vicinity of Philadelphia and Trenton*.

**Tree Growth Factors by Species**

<u>tree species</u>	<u>growth factor</u>	<u>tree species</u>	<u>growth factor</u>
Green Ash	4.0	Red Maple	4.5
White Ash	5.0	Norway Maple	4.5
Aspen spp	2.0	Silver Maple	3.0
American Beech	6.0	Sugar Maple	5.5
European Beech	4.0	Pin Oak	3.0
Basswood	3.0	Northern Red Oak	4.0
European White Birch	5.0	Scarlet Oak	4.0
River Birch	3.5	Shingle Oak	6.0
Paper Birch (aka White)	5.0	Shumard Oak	3.0
Yellow Buckeye	5.0	White Oak	5.0
Black Cherry	5.0	Bradford Pear	3.0
Kentucky Coffeetree	3.0	Austrian Pine	4.5
Cottonwood	2.0	Red Pine	5.5
Dogwood	7.0	Scotch Pine	3.5
American Elm	4.0	White Pine	5.0
Douglas Fir	5.0	Tulip Poplar (Tulip Tree)	3.0
White Fir	7.5	Redbud	7.0
Shagbark Hickory	7.5	Colorado Blue Spruce	4.5
Common Horsechestnut	8.0	Norway Spruce	5.0
Ironwood	7.0	Sweetgum	4.0
Littleleaf Linden	3.0	American Sycamore	4.0
Black Maple	5.0	Black Walnut	4.5

**Instructions**

- Determine the species of your tree
- With a tape measure, measure the circumference of your tree (in inches) 4 1/2 feet from the ground (breast height)
- Determine the diameter of your tree at breast height (DBH) using the following formula:  

$$\text{Diameter} = \text{Circumference} \text{ divided by } 3.14 \text{ (pi)}$$
- Calculate the age of your tree using the table above and the following formula:  

$$\text{Age} = \text{Diameter} \times \text{Growth Factor}$$

Figure 3.10. Calculating the age of trees using growth factor charts and simple mathematics. System developed by the International Society of Arboriculture. The above diagram is at <https://beveritt.files.wordpress.com/2016/07/growth-factors-table.png>.



Figure 4.1. The Analysis Units (red numbers) into which the Preserve was divided for the study. The base is the 1953 aerial photograph, onto which modern lot lines and the Preserve Boundary (yellow) have been added.

FIGURE 4.2. ANALYSIS UNITS (BASED ON 1953 AERIAL PHOTO)

Analysis Unit	Lot #	Land Use/Vegetation 2018	Land Use 2013	Land Use 1995	Land Use 1972	Land Use 1953	Land Use 1931	Land Use 1903 (not revised from 1888?)	Land Use 1888	General Description and Cultural Features
1	5.14.03	Grassland w/isolated cedars and other trees	Grassland w/isolated cedars and other trees	Scrub?	Scrub.	Open?	Open	Open	Open	Possible A. Hunt homestead site on 1849 map
2	5.14.03	Open Woodland	Wooded	Wooded	Wooded	Wooded	Wooded	Open	Open	Shagbark Hickory and White Oak date from 1880's
3	5.14.03	Wooded, with a few older/pasture trees	Wooded	Wooded	Scrub, small area of woodland between stream and 518	Open, small area of woodland between stream and 518	Open, small area of woodland between stream and 518	Open, small area of woodland between stream and 518	Open, small area of woodland between stream and 518	
4	5.14.03	Grassland w/isolated mature/dying hardwoods	Grassland w/isolated mature/dying hardwoods	Partly wooded?	Partly wooded	Open, some scrub	Open	Open	Open	
5	5.14.03	wooded	wooded	wooded	wooded	wooded	Open	Open	Open	
6	5.22	wooded	wooded	wooded	partly wooded	scrub and small trees north 500 ft	Open	Open	Open	White Oak pasture "wolf" tree nr corner c. 1780
7	5.22	Many cedars, overtopped by hardwoods	Fully wooded	Wooded	Cedars, especially in center	Open	Open	Open	Open	
8	5.22	Wooded. Some older pasture trees in south part. Woodland developed 1953-72.	All wooded	All wooded	All wooded	Partly open north of stream (post logging). Open to south (cleared since 1903)	Wooded scrub north of stream; being logged. Open onto 518	Wooded south of stream	Wooded south of stream	"Grand Central" cultural features: building foundation, walls, modifications to boundaries

FIGURE 4.2. ANALYSIS UNITS (BASED ON 1953 AERIAL PHOTO)

Analysis Unit	Lot #	Land Use/Vegetation 2018	Land Use 2013	Land Use 1995	Land Use 1972	Land Use 1953	Land Use 1931	Land Use 1903 (not revised from 1888?)	Land Use 1888	General Description and Cultural Features
9	5.22	wooded	wooded	wooded	cedars and small trees	Open in center. Young trees growing in southern 300 feet	Open	Open	Open	
10	5.5.02	Experimental fenced regrowth area	scrub	scrub	Open	Open	Open	Open	Open	Argillite Boundary marker NW corner
11	5.5.02	woodland	wooded	wooded	Open	Open	Open	Open	Open	
12	5.5.02	cedars	wooded	wooded	Open	Open	Open	Open	Open	
13	5.5.02	cedars and young hardwoods	wooded	wooded	Open	Open	Open	Open	Open	
14	5.5.02	open woodland with hickory. Cedars being overtopped by hardwoods	wooded	wooded	mostly wooded	Southern half wooded or reverting	Woodland SE Corner	Open	Open	metal trash scatter-se corner
15	5.5.02	open woodland with hickory. Cedars being overtopped by hardwoods	wooded	wooded	Open	Open	Open	Open	Open	
16	5.5.02	open woodland with hickory. Cedars being overtopped by hardwoods	wooded	wooded	Wooded	Open	Open	Open	Open	
17	5.43	woodland. Cedars, conifers, hardwoods. Conifer plantation SW	Wooded	wooded	Open south, wooded north	E-W line of trees south of N bdy	E-W line of trees south of N bdy	Open	Open	
18	5.43	meadow, young trees center	Open south, wooded north	Open south, wooded north	Open south, wooded north	hedgeline s of N bdy	hedgeline s of N bdy	Open	Open	
19	5.43	scrub from meadow	Open south, wooded north	Open	Open	Open	Open	Open	Open	

**FIGURE 4.2. ANALYSIS UNITS (BASED ON 1953 AERIAL PHOTO)**

Analysis Unit	Lot #	Land Use/Vegetation 2018	Land Use 2013	Land Use 1995	Land Use 1972	Land Use 1953	Land Use 1931	Land Use 1903 (not revised from 1888?)	Land Use 1888	General Description and Cultural Features
20	5.43	mowed meadow	Open	Open	Open	Open	Open	Open	Open	
21	5.43	meadow, conifer plantation	Open	Open	Open	Open	Open	Open	Open	stone cairn on a side of wall 26/21
22	5.43	wooded, with larger trees along the creek	wooded	wooded	wooded	wooded south of creek	Open woodland: logged since 1888?	wooded	wooded	
23	5.43	young trees and shrubs about 10' high with grass.	Open	Open	Open	Open	Open	Open	Open	

**Figure 4.3. Analysis Unit Boundaries 2018**

<b>AU</b>		<b>AU or limit</b>	<b>Boundary Type</b>	<b>Comment</b>	<b>Lot Line?</b>
1	/	Stony Brook Rd	bank		
1	/	2	bank, slight		
2	/	Lot 14.031	none		Y
2	/	north	bank, slight		
2	/	3	none		
2	/	4	stone bank, ditch on e		
3	/	518	none		
3	/	east	none		
3	/	west	none		
4	/	6	stone bank, ditch on w		Y
4	/	7	stone bank, ditch on w		Y
4	/	north	creek		
4	/	5	ditch		
4	/	5	ditch		
5	/	south	none		Y
5	/	8	none		
6	/	7	none		
6	/	9	none		
7	/	8	none		
7	/	9	stone wall		
8	/	Lot 46	stone wall		Y
8	/	17	stone wall, ditch e side	typical wall construction	Y
8		9	none		
8	/	Route 518	none		
9	/	north	creek		Y
9	/	10	tree line		
9	/	12	tree line		
10	/	north	tree line		Y
10	/	13	none		
10	/	11	stone bank with trees		
10	/	12	unknown		
11	/	north	stone bank with trees		Y
11	/	east	none		

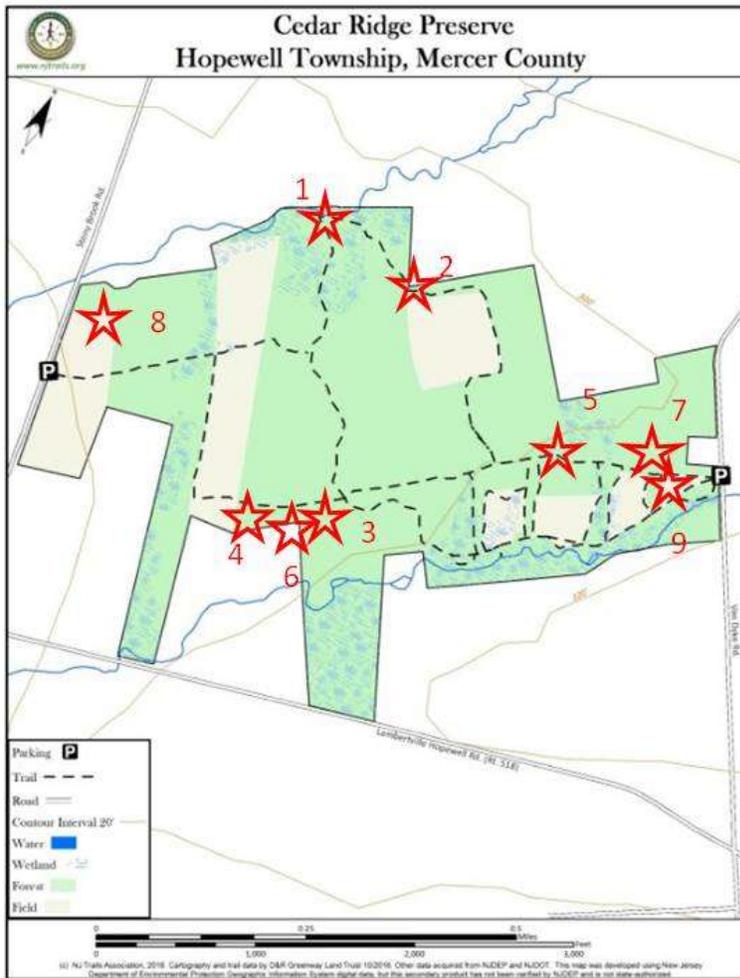
11	/	14	unknown		
12		17	stone wall, ditch on s		Y
12	/	13	bank, trees above	probably a wall. Strong tree line	
13	/	18	stone wall, ditch on s		Y
13	/	14	stone wall	one build with the e-w wall at s end (13/18)	
14	/	19	stone wall, ditch on s	with dogleg	Y
14	/	20	stone wall, ditch on s		Y
14	/	16	none		
15	/	north	bank, slight		Y
15	/	Van Dyke	bank	ditch on W	
15	/	16	bank, slight	slight terrace	
16	/	Van Dyke	bank	ditch on W	
16	/	21	stone wall		
17	/	23	stone bank	west end only	
17	/	18	stone wall, trees above	strong tree line. Stone wall definitely laid	
18	/	23	post and wire	slight bank?	
18	/	19	tree line		
19	/	20	ditch	meandering stream hardwoods & cedars	
19	/	23	none		
20	/	21	ditch	cedars and artificial wetland	
21	/	23	creek		
22	/	south	none		Y
22	/	23	none		
23	/	south	none		Y
23	/	Van Dyke	none		



Figure 4.4. Argillite wall construction, as seen in this cross section of the boundary wall 7/9. Wedge-shaped argillite stones are used to form a stable structure which tapers from the ground upwards to a height of 2.5 to three feet. The top is marked by flat slabs, which presumably help to protect the interior of the wall from water penetration. View looking north. Smallest units on pole are centimeters. Photographer: Ian Burrow 2018.



Figure 4.5. White Oak (*Quercus Alba*) pasture or “wolf” tree at the northwestern part of AU 6. Note branch of Stony Brook on right. The tree is calculated to be about 235 years old, and was probably a sapling in about 1780. This area was still pasture in 1953, but was reverting to second growth forest by 1972. Photographer: Ian Burrow 2017.



#### SOME CULTURAL FEATURES

1. "WOLF" OR OLD PASTURE TREE
2. STONE CORNER MARKER
3. WALL, BUILDING, AND ROAD TRACE
4. ARGILLITE QUARRY
5. "MYSTERY CORNER"
6. WALL JUNCTION INVESTIGATION
7. 20<sup>TH</sup> CENTURY METAL TRASH DUMP
8. POSSIBLE A. HART SITE 1849.
9. STONE CAIRN

Figure 4.6. Specific Cultural Features identified in the Survey. This does not include fields and field boundaries.



Figure 4.7. “Mystery Corner”: Change of direction on the long east-west wall in the southeastern portion of the Preserve. The view is to the northeast from AU 19. AU 14 is on the other side of the wall. The short north-south section of the wall on the right continues south for about 50 feet before the wall returns towards the east. Note former fence post set into angle of wall, probably originally for barbed wire. The wall has the distinctive construction technique seen more clearly on Figure 4.4. Photograph: Ian Burrow 2018.



Figure 4.8. Argillite Boundary Corner Marker at the northwest corner of AU10 where it meets AU 9 (on the left). View facing north. Small units are centimeters. Note cross on top. The northern boundary of AU10, off to the right, is roughly marked by a tree line which also forms the boundary of the Preserve. The east boundary of AU 9 is undefined in the modern landscape. Photographer: Ian Burrow 2018.



Figure 4.9. Quarried argillite outcrop in the northwestern portion of AU 8. Note detached blocks on right. When further split, these would be suitable for wall-building. This outcrop defines the southern edge of the terrace landform which runs from AU 5 on the west to AU 19 on the east. Photographer: Ian Burrow 2018.

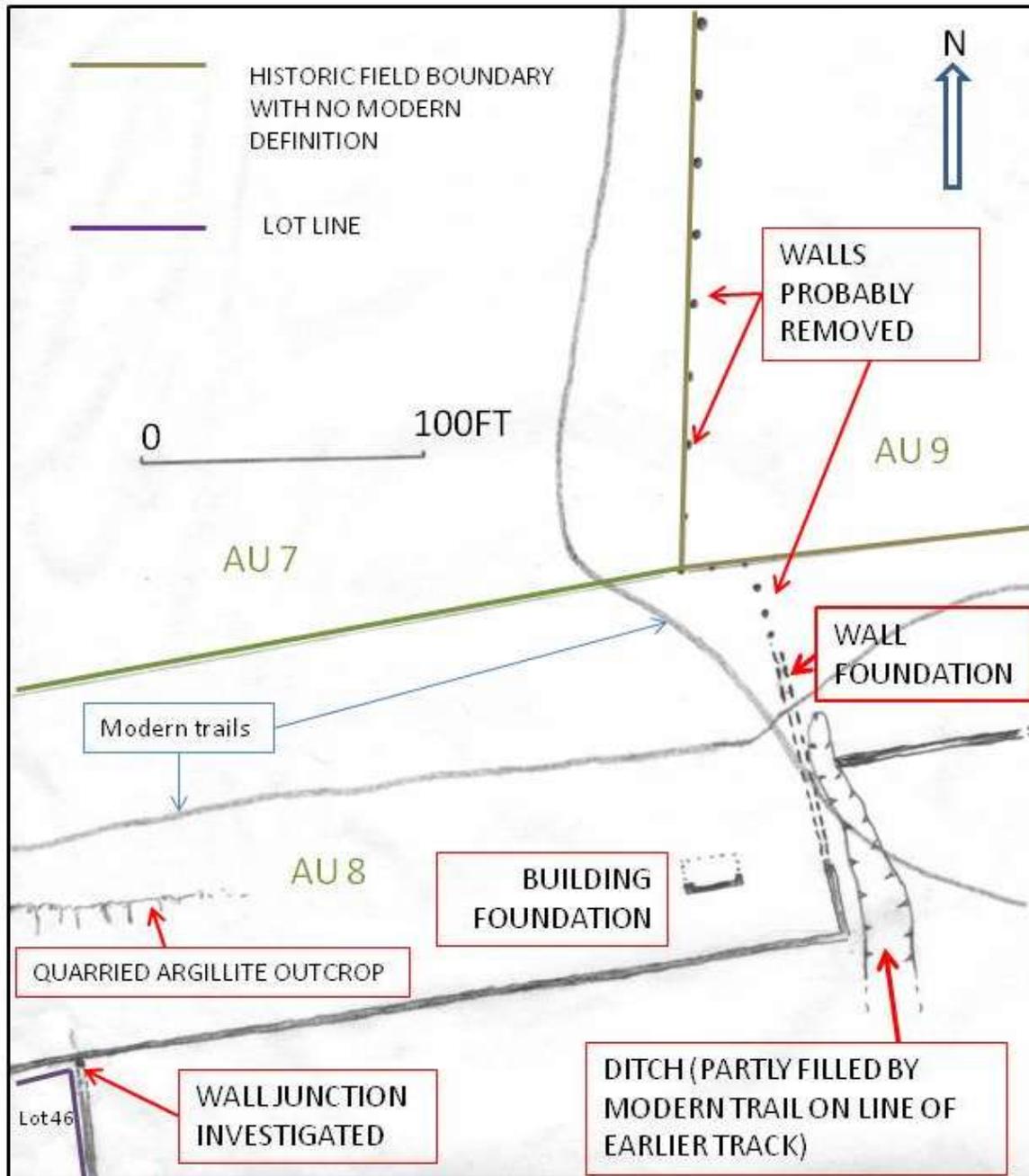


Figure 4.10. Map of cultural features in the northern part of Analysis Unit 8. Investigations at the northeast corner of Lot 46 (bottom left) showed that the east-west wall was primary to the north-south wall forming the east boundary of Lot 46. The north-south wall alignment east of the building foundation at one time continued as far as the 8/9 boundary, but has been removed and obscured by modern and earlier tracks which broke through it to gain access from AU 7 down to the southeast. This change had taken place by 1931.





Figure 4.12. Building foundation terrace revetment in the northern part of AU 8. View facing west. Inset shows the wall (on right) in relation to the long wall which runs west to form the north boundary of Lot 46. Photographer: Ian Burrow 2018.



Investigation of Junction of Walls 8A and 8B. View looking north. The west and east sections of Wall 8A survive to close to original height, while the area of the intersection with Wall 8B in the center is much lower. Large slabs mark the east face of 8B, which has been removed for about 25 yards south of the viewpoint. Beyond that Wall 8B reappears, standing to about 2.5 feet and continuing south for an unknown distance. Photographer: Ian Burrow April 2018.

Figure 4.13. Investigation of wall junctions in AU 8, photo 1. Note the crest of the terrace, where argillite outcrops at the surface, at rear of view.



Figure 4.14. Investigation of wall junctions in AU 8, photo 2. View facing south from the top of east-west wall 8A along the line of wall 8B, which forms the current eastern boundary of Lot 46 and the west boundary of the Preserve in this area. The stones in the foreground are the remnants of the north end of 8B where it was inserted into the pre-existing wall 8A. To the south, 8B has been removed for a short distance, but reappears beyond the fallen trees, to continue for an unknown distance. Photograph Ian Burrow April 2018.



Figure 5.1. Front and back views of axe-head found at a springhead on the Katzenbach Farm on the north side of Route 518, west of Van Dyke Road, Hopewell Township. This is a “full-grooved” axe made of the local argillite, and is an artifact typical of the Late Archaic Period in New Jersey. It is probably between 4000 and 6000 years old. The central groove, showing the “pecking” technique used to shape these artifacts, was the seating for a wood fiber or rawhide hafting system attached to a wooden handle. The blade (on the left) has been shattered, while the butt shows evidence of use as a hammer. The axe is about 14.3 centimeters (5.72 inches) long, 8.5 cm. (3.4 in.) wide and 5.1 cm (2 in.) thick. Photographer: Ian Burrow, July 2018. With thanks to Charlize and Bru Katzenbach.

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<sup>i</sup> *Lost Amazon Villages Uncovered by Archaeologists*. The Guardian (UK)  
<https://www.theguardian.com/science/2018/mar/27/lost-amazon-villages-uncovered-by-archaeologists> March 27  
2018

<sup>ii</sup> [www.ecowatch.com/anthropocene-1991220147.html](http://www.ecowatch.com/anthropocene-1991220147.html). The designation was adopted at the International Geological Congress in Cape Town in August 2017.

<sup>iii</sup> The most accessible summary is Luce 2001, but see also the Sourland Conservancy's website  
<https://sourland.org/> and *The Sourland Legacy: A report by the Sourland Regional Citizens Planning Council* for more resources.

<sup>ii</sup> Hunter and Porter 1990:11.

<sup>v</sup> <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>, accessed 2/22/18.

<sup>vi</sup> [https://soilseries.sc.egov.usda.gov/OSD\\_Docs/C/CHALFONT.html](https://soilseries.sc.egov.usda.gov/OSD_Docs/C/CHALFONT.html), accessed 2/22/18.

<sup>vii</sup> <https://casoilresource.lawr.ucdavis.edu/see/#chalfont>, accessed 2/22/18.